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Choi

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(54) **DOOR RAIL SYSTEM**

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E06B 3/54	(2006.01)
E06B 5/00	(2006.01)
E06B 7/28	(2006.01)

(52) **U.S. Cl.**
CPC ***E06B 3/549*** (2013.01); ***E06B 3/5454*** (2013.01); ***E06B 5/00*** (2013.01); ***E06B 7/28*** (2013.01)

(58) **Field of Classification Search**
CPC E06B 3/549; E06B 5/00; E06B 3/5864; E06B 3/5871; E06B 3/585; E06B 3/5857; E06B 7/28
See application file for complete search history.

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(57) **ABSTRACT**

A door rail system for mounting a pane includes a clamp housing having a tapered projection and a pair of clamps having a recess. A screw fastens the clamps together from a side of the clamp housing so that the recesses and tapered projection are configured to form a secure dovetail joint for holding a pane. The recesses (and clamps) are symmetrical and the tapered projection is at the center so that a pane can be securely held at the center without being tilted. The door rail system includes an accessory channel and first and second mounting members. The first and second mounting members are slidably attached to each other by a sliding dovetail joint so that each mounting member can slide against the other mounting member.

19 Claims, 8 Drawing Sheets

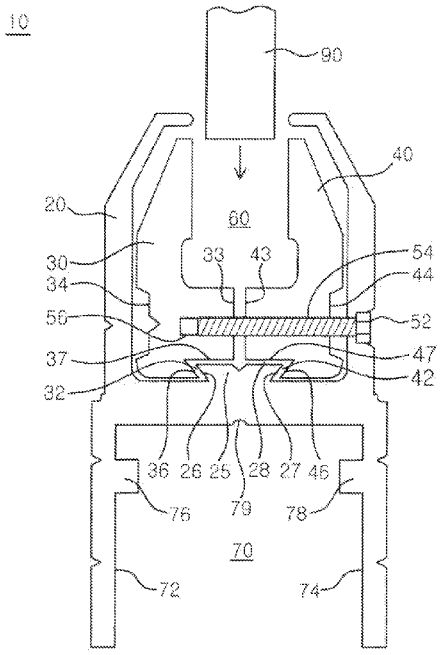

FIG. 1 PRIOR ART

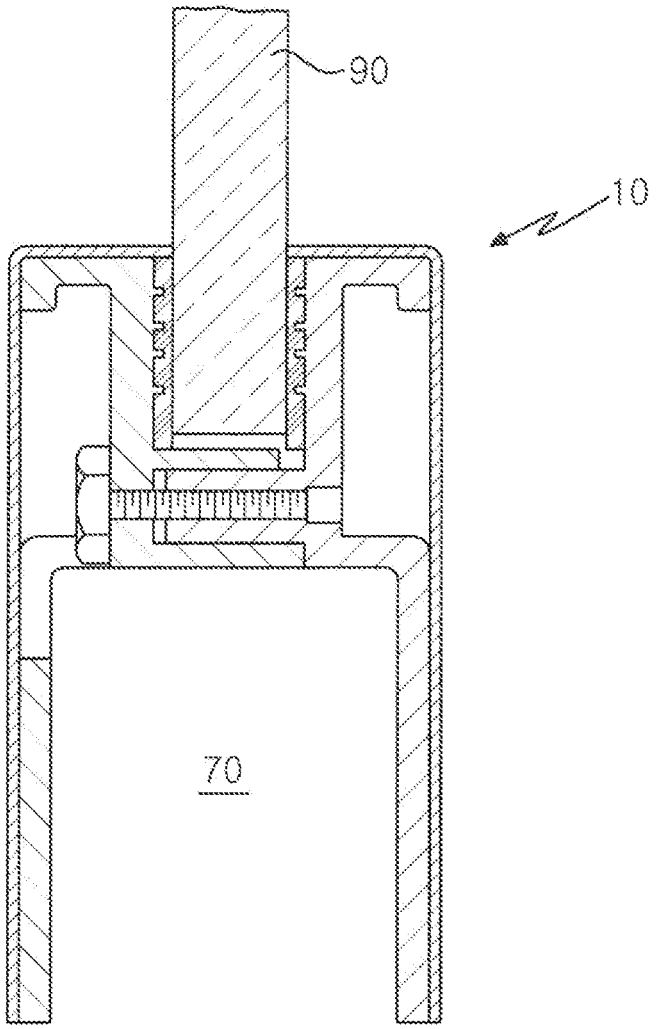

FIG.2 PRIOR ART

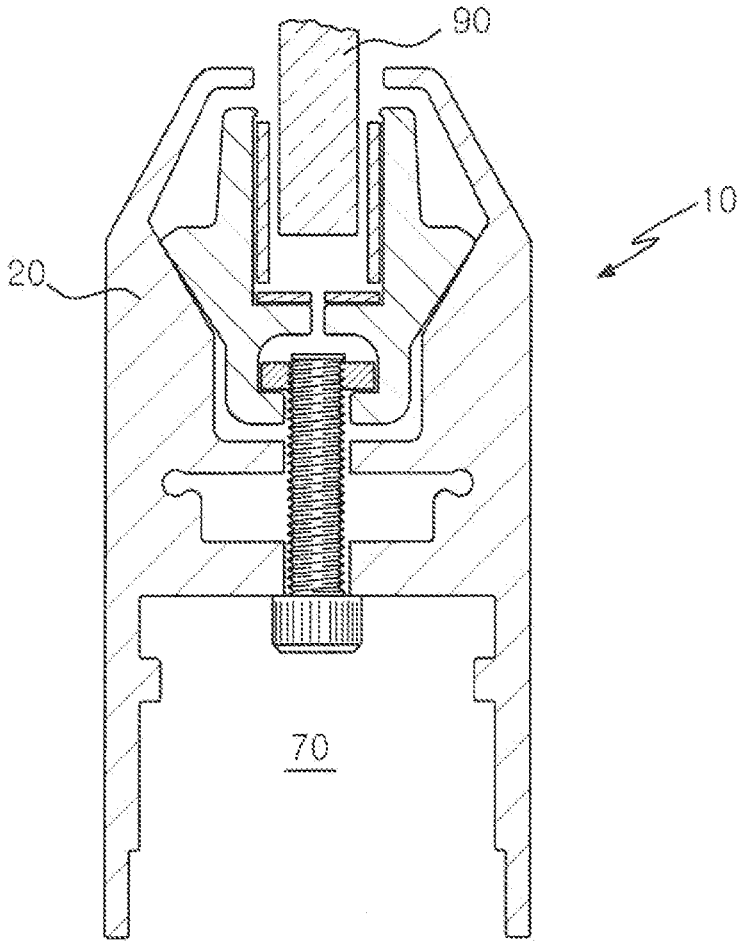

FIG.3

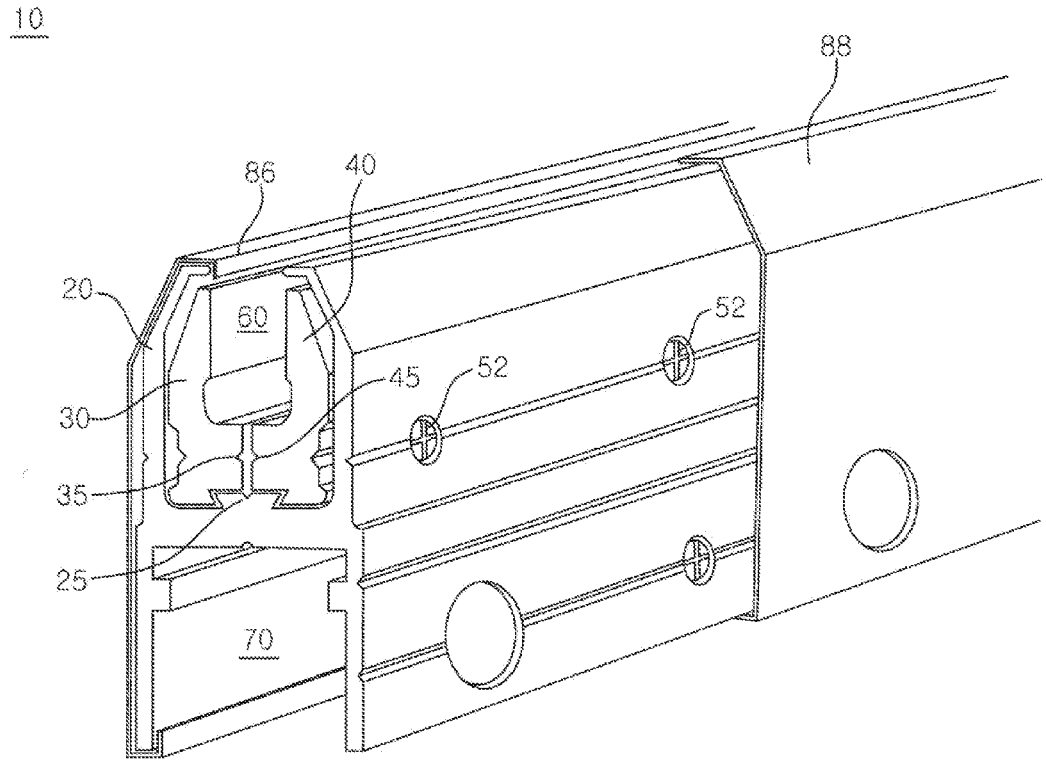

FIG.4

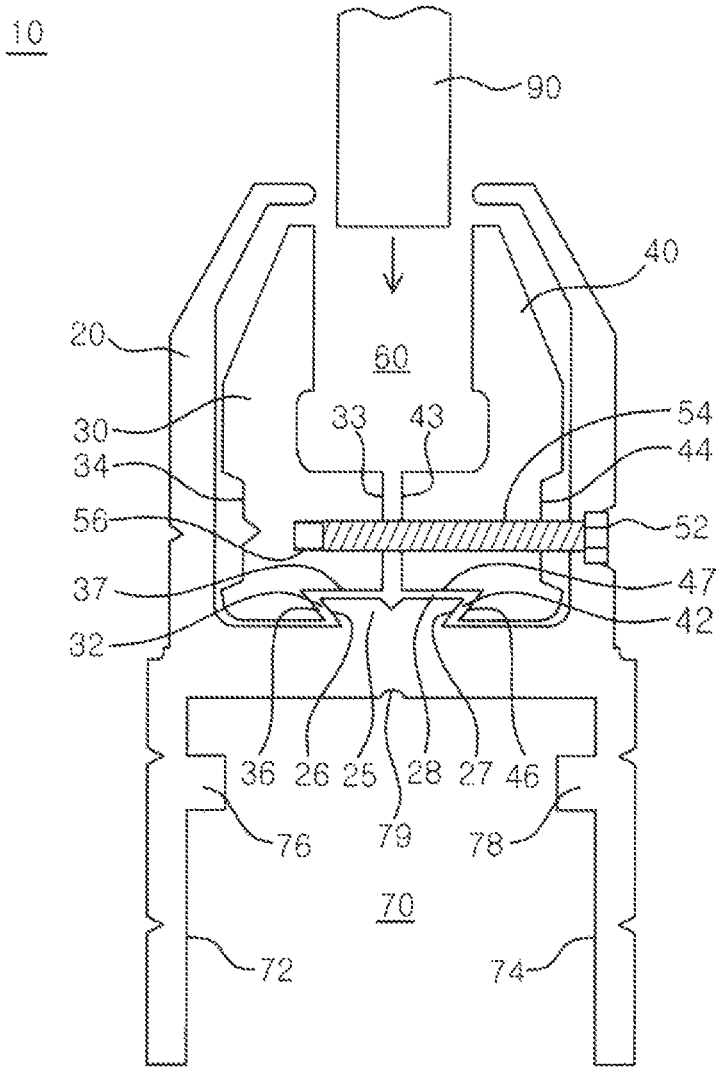
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FIG.5

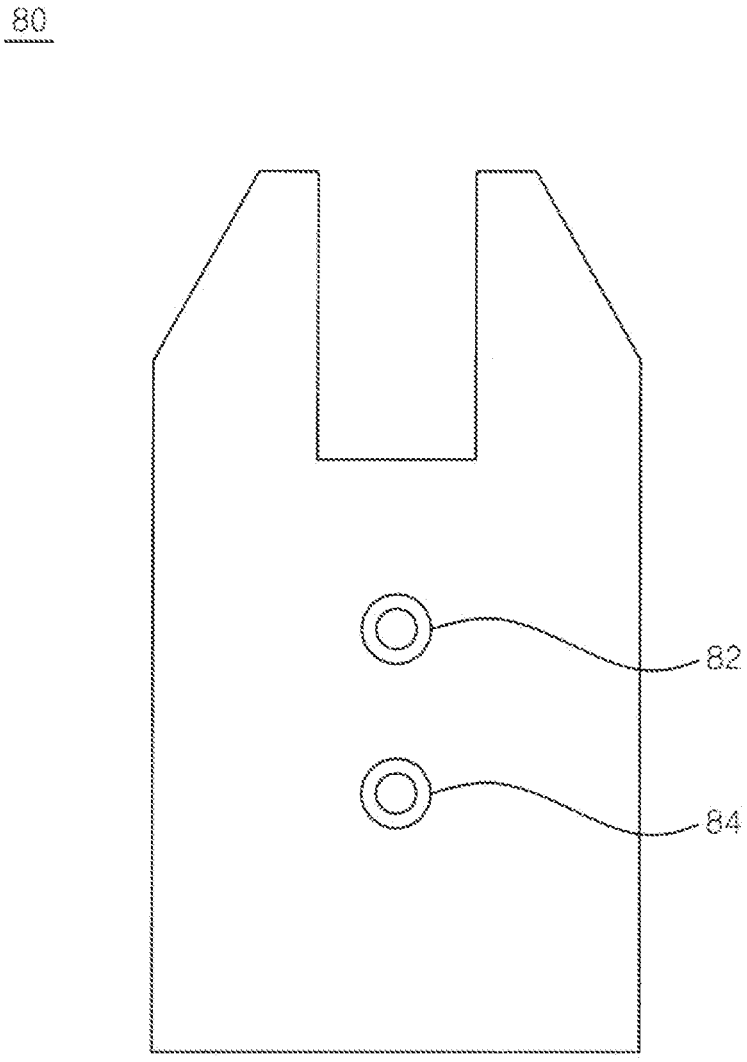


FIG.6

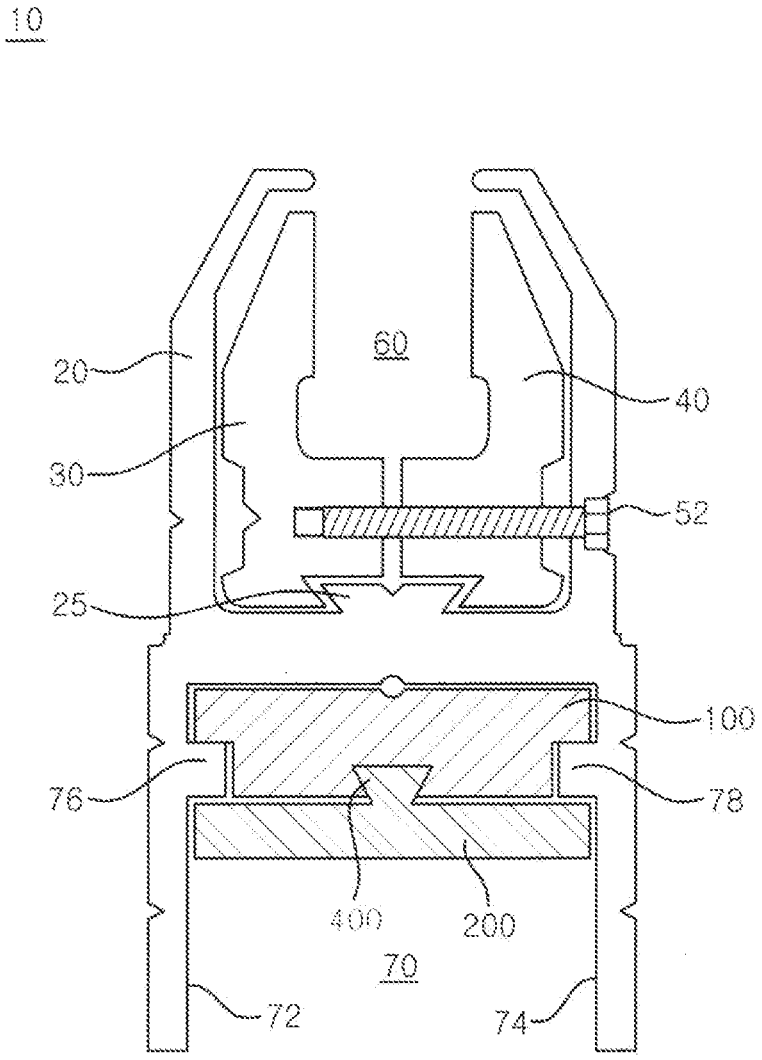


FIG.7

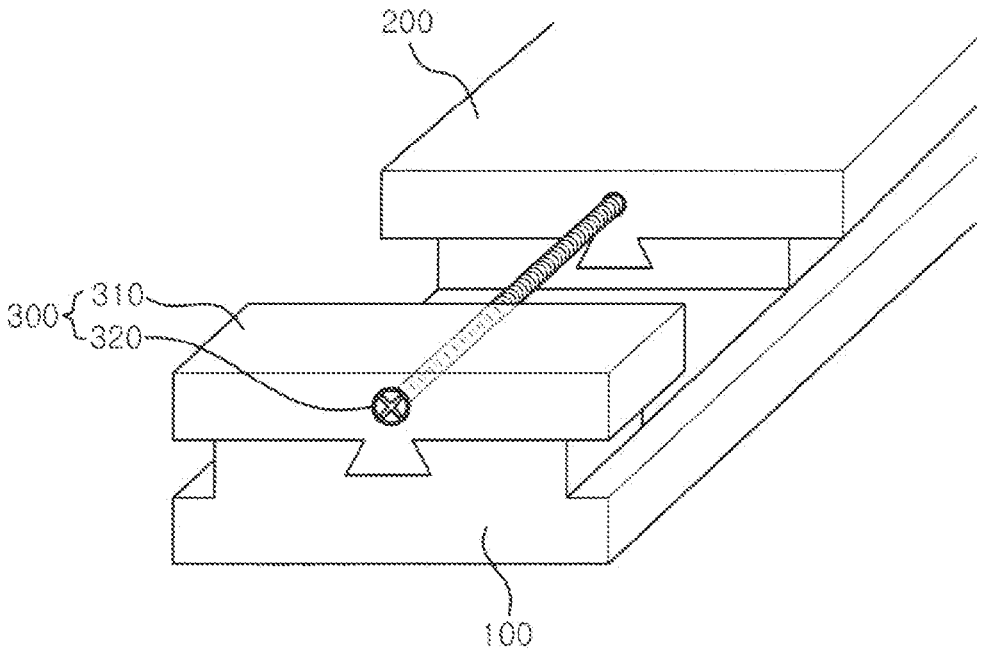
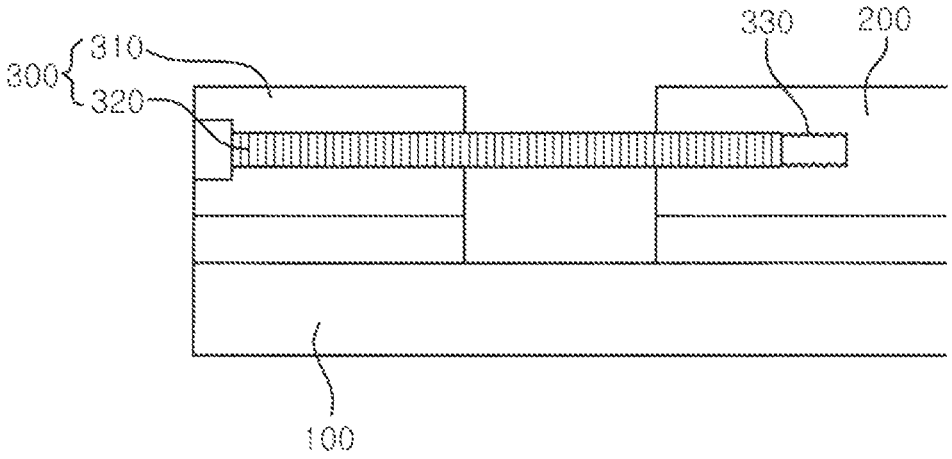


FIG.8



DOOR RAIL SYSTEM

FIELD OF THE INVENTION

The present invention relates to a door rail system for holding a pane such as plate glass panes or panels and, more particularly, to a door rail system having a pair of clamps having recesses and a clamp housing having a tapered projection. The recesses and tapered projection are configured to form a dovetail joint when the clamps are clamped together.

BACKGROUND OF THE INVENTION

Door rail systems are widely used to hold plate glass panes or panels, including transparent, translucent or opaque panels (hereinafter called "pane") and such systems employs support rails or similar frames which attach to the top or bottom edges of the pane.

FIG. **1** shows a prior art rail system **10** having a male rail section and a female rail section. The male and female sections are clamped together by a screw to hold a pane **90** and to form an accessory channel **70**. The accessory channel **70** is necessary to mount a door closure member, locking hardware, pivots, hinges or other mounting structure required to mount the rail system **10** in a door or other frame. However, the accessory channel **70** is defined by two pieces of male and female sections and thus, to dissemble the pane, the accessory channel **70** needs to be dissembled as well.

To overcome this disadvantage, another rail system **10** was developed as in FIG. **2**, having first and second clamps and a housing **20**. The clamps are clamped together by rotating a screw from a bottom to hold a pane **90**. However, rotating a screw from a bottom is inconvenient and the rail system **10** has to be dissembled from a door or other frame before dissembling the pane **90**.

Besides, conventional door rail systems requires careful work of mounting such system to a door. Once the door rail system is mounted onto a door, its location cannot be adjusted and to adjust, it has to be dissembled and re-mounted. However, slight discrepancy or error is very common and accordingly re-work is common.

Therefore, to solve the above problems, there is a need for a door rail system having a pair of clamps having recesses, a clamp housing having a tapered projection, and a minute location adjusting means. This invention is directed to solve these problems and satisfy the long-felt need.

SUMMARY OF THE INVENTION

The present invention contrives to solve the disadvantages of the prior art. The present invention provides a door rail system having a pair of clamps having recesses and a clamp housing having a tapered projection.

The object of the present invention is to provide a door rail system for mounting a pane, which includes a longitudinally extending clamp housing, having a tapered projection; a first longitudinally extending clamp, having a first recess; a second longitudinally extending clamp, having a second recess. An adjustable fastening means fastens the first and second clamps to the tapered projection from a side of the clamp housing.

Another object of the present invention is to provide a door rail system for mounting a pane, which includes a clamp housing having a tapered projection and a pair of clamps having a recess. A screw fastens the clamps together from a side of the clamp housing so that the recesses and tapered projection are configured to form a secure dovetail joint for holding a pane. The recesses (and clamps) are symmetrical and the tapered projection is at the center so that a pane can be securely held at the center without being tilted.

Still another object of the present invention is to provide a door rail system for mounting a pane, which includes an accessory channel and first and second mounting members. The first and second mounting members are slidably attached to each other by a sliding dovetail joint so that each mounting member can slide against the other mounting member.

The advantages of the present invention are: (1) the door rail system has a clamp housing having a tapered projection and a pair of claims having symmetrical recesses for securely holding a pane at a center without being tilted; (2) the adjustable fastening means such as a screw is on a side of the clamp housing and thus the assembly work is easier and more convenient and the door rail system does not have to be dissembled from a door to dissemble the pane; (3) a pair of mounting members slidably attached to each other by a sliding dovetail joint are secured in the accessory joint, and thus minute adjustment of the door rail system with respect to a door is possible; and (4) the door rail system of the present invention has a slidably attachable side cover(s) and such side cover can provide aesthetic appearance.

Although the present invention is briefly summarized, the fuller understanding of the invention can be obtained by the following drawings, detailed description and appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, aspects and advantages of the present invention will become better understood with reference to the accompanying drawings, wherein:

FIG. **1** shows a cross-sectional view of a conventional door rail system;

FIG. **2** shows a cross-sectional view of another conventional door rail system;

FIG. **3** shows a perspective view of a door rail system according to one embodiment of the present invention;

FIG. **4** shows a cross-sectional view of the door rail system according to one embodiment of the present invention;

FIG. **5** shows a front view of an end cap of the door rail system according to the present invention;

FIG. **6** shows a cross-sectional view of the door rail system having first and second mounting members according to another embodiment of the present invention;

FIG. **7** shows a partial perspective view of the first and second mounting members according to the present invention; and

FIG. **8** shows a partial cross-sectional view of the first and second mounting members according to the present invention.

DETAILED DESCRIPTION EMBODIMENTS OF THE INVENTION

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings, which form a part of this disclosure. It is to be understood that this invention is not limited to the specific devices, methods, conditions or parameters described and/or shown herein, and that the terminology used herein is for the purpose of describing particular embodiments by way of example only and is not intended to be limiting of the claimed invention.

Also, as used in the specification including the appended claims, the singular forms "a", "an", and "the" include the

plural, and reference to a particular numerical value includes at least that particular value, unless the context clearly dictates otherwise. Ranges may be expressed herein as from "about" or "approximately" one particular value and/or to "about" or "approximately" another particular value. When such a range is expressed, another embodiment includes from the one particular value and/or to the other particular value. Similarly, when values are expressed as approximations, by use of the antecedent "about", it will be understood that the particular value forms another embodiment.

FIGS. **3** and **4** show a perspective view and a cross-sectional view of a door rail system **10** according to one embodiment of the present invention.

The door rail system **10** for mounting a pane **90** comprises: a longitudinally extending clamp housing **20**, having a tapered projection **25**; a first longitudinally extending clamp **30**, having a first recess **32**; and a second longitudinally extending clamp **40**, having a second recess **42**. The door rail system **10** further includes an adjustable fastening means **52**, **54**, and **56** for fastening the first and second clamps **30** and **40** to the tapered projection **25**; and a pane channel **60** defined by the first and second clamps **30** and **40** for receiving an edge of the pane **90**. The tapered projection **25** is configured to interlock with the first and second recesses **32** and **42** when the first and second clamps **30** and **40** are clamped together by the adjustable fastening means **52**, **54** and **56**. Preferably, the first and second recesses **32** and **42** are symmetrical and the first and second clamps **30** and **40** may be symmetrical as well. The tapered projection **25** is located at the center as shown in FIG. **4** for securely holding the pane **90** at the center vertically without being tilted.

The adjustable fastening means comprises a screw **52**, a through hole **54** and a threaded hole **56**. The through hole **54** is configured so that the screw **52** can pass there-through and the threaded hole **56** is configured to be engaged with the screw **52** for clamping the first and second clamps **30** and **40** together to securely hold the pane **90**.

The first clamp **30** comprises a first inner wall **33** and a first outer wall **34**, and the second clamp **40** comprises a second inner wall **43** and a second outer wall **44** as shown in FIG. **4**.

The through hole **54** may be formed on the second clamp **40** and the threaded hole **56** may be formed on the first clamp **30** as shown in FIG. **4**. The screw **52** advances through the second outer wall **44** of the second clamp **40** and the through hole **54** of the second clamp **40** and then, the screw **52** is engaged with the threaded hole **56** of the first clamp **30**.

Alternatively, the through hole **54** may be formed on the first clamp **30** and the threaded hole **56** may be formed on the second clamp **40**. The screw **52** advances through the first outer wall **34** of the first clamp **30** and the through hole **54** of the first clamp **30** and then, the screw **52** is engaged with the threaded hole **56** of the second clamp **40**.

A first groove **35** may be formed on the first inner wall **33** and a second groove **45** may be formed on the second inner wall **43**, and the first and second grooves **35** and **45** may form an opening when the first and second clamps **30** and **40** are clamped together as shown in FIG. **3**. The grooves **35** and **45** may be formed passing through the through holes **54** or threaded holes **56** on the inner walls **33** and **43**.

FIG. **5** shows a front view of an end cap **80**. The door rail system **40** may further comprises an end cap **80** secured at an end of the clamp housing **20** by an end cap fastening means **82** and **84**. The end cap fastening means may be a screw **82** which may be engaged with threads of the opening formed by the grooves **35**. Another screw **84** may be engaged with threads of another opening formed on the base surface of the accessory channel **70**.

The end cap fastening means may comprise an end cap screw **82** which is configured to be engaged with the first and second grooves **35** and **45**. Ends of the first and second grooves **35** and **45** may be threaded.

The tapered projection **25** may comprise a first tapered wall **26**, a second tapered wall **27** and a wide end surface **28** to form a dovetail shape. For conforming to the dovetail shape of the tapered projection **25**, the first recess **32** comprises a first inclined wall **36** and a first flat surface **37** and the second recess **42** comprises a second inclined wall **46** and a second flat surface **47**.

The first inclined wall **36** is located adjacent to the first tapered wall **26** and configured to be approximately parallel to the first tapered wall **26** when the first and second clamps **30** and **40** are clamped together. In addition, the second inclined wall **46** is located adjacent to the second tapered wall **27** and configured to be approximately parallel to the second tapered wall **27** when the first and second clamps **30** and **40** are clamped together. Furthermore, the first and second flat surfaces **37** and **47** are located adjacent to the wide end surface **28** and configured to be approximately parallel to the wide end surface **28** when the first and second clamps **30** and **40** are clamped together.

For securely holding the pane **90** vertically, when the first and second clamps **30** and **40** are clamped together by the screw **52**, the first inclined wall **36** is in contact with the first tapered wall **26**, the second inclined wall **46** is in contact with the second tapered wall **27**, and the first and second flat surfaces **37** and **47** are in contact with the wide end surface **28**.

As in FIG. **3**, the door rail system **10** may further include a first slide cover **86** for covering a first exterior side surface of the clamp housing **20** and a second slide cover **88** for covering a second exterior side surface of the clamp housing **20**. The slide covers **86** and **88** are slidably engaged with the clamp housing **20**.

FIG. **6** shows a cross-sectional view of the door rail system having first and second mounting members **100** and **200** according to another embodiment of the present invention. FIGS. **7** and **8** respectively show a partial perspective view and a partial cross-sectional view of the first and second mounting members **100** and **200**.

The door rail system **10** may further include an accessory channel **70** and the accessory channel **70** may include a first inner wall **72**, a second inner wall **74** and a base surface. The base surface connects the first and second inner walls **72** and **74**.

A first protrusion **76** may be formed on the first inner wall **72** of the accessory channel **70** and a second protrusion **78** may be formed on the second inner wall **74** of the accessory channel **70**. The first and second protrusions **76** and **78** are longitudinally extending.

The door rail system **10** may further comprises a first mounting member **100** which is configured to be slidably inserted into and engaged with the accessory channel **70** and secured therein by the first and second protrusions **76** and **78**.

The door rail system **10** may further comprise a second mounting member **200** which is configured to be slidably engaged with the first mounting member **100** by a sliding dovetail joint **400** so that the second mounting member **200** can slide against the first mounting member **100**.

The door rail system **10** may further include a location adjusting means **300** for slidably adjusting a location of the second mounting member **200** with respect to the first member **100** as shown in FIGS. **7** and **8**.

The location adjusting means **300** comprises an anchor **310** and a screw **320** wherein the anchor **310** is fixedly attached to the first mounting member **100**. A through hole is formed on

the anchor **310** so that the screw **320** can pass through and a threaded hole **330** is formed on the second mounting member **200**. The screw **320** passes through the through hole and is engaged with the threaded hole **330**. Accordingly, the location adjusting means **300** adjusts the location of the second mounting member by rotating the screw **320**. This construction by the mounting members **100** and **200** is very useful for delicate or minute adjustment of the location of the second mounting member **200**. After attaching the door rail system **10** to a door, there may be some error in correct location of the door rail system **10** and the error can be corrected by adjusting the location of the second mounting member **200**. The door rail system **10** does not have to be dissembled and re-assembled to correct the error.

The structure of the mounting members **100** and **200** may be independent or separate of the structure by the tapered projection **25** and the clamps **30** and **40**. Thus, in one embodiment of the present invention, the door rail system **10** for mounting a pane may comprise an accessory channel **70** having a first inner wall **72**, a second inner wall **74** and a base surface wherein a first protrusion **76** is formed on the first inner wall **72** and a second protrusion **78** is formed on the second inner wall **74**. The door rail system **10** may further comprise a first mounting member **100**, which is configured to be slidably inserted into and engaged with the accessory channel **70**, and a second mounting member **200** which is configured to be slidably engaged with the first mounting member **100** by a sliding dovetail joint **400** so that the second mounting member **200** can slide against the first mounting member **100**. The door rail system **10** further includes a location adjusting means **300** for slidably adjusting a location of the second mounting member **200** with respect to the first member **100**. The first mounting member **100** is secured in the accessory channel **70** by the first and second protrusions **76** and **78**.

The location adjusting means **300** comprises an anchor **310** and a screw **320** wherein the anchor **310** is fixedly attached to the first mounting member **100**. A through hole is formed on the anchor **310** and a threaded hole **330** is formed on the second mounting member **200** such that the screw **320** can pass through the through hole and be engaged with the threaded hole **330**. The location adjusting means **300** adjusts the location of the second mounting member by rotating the screw **320**.

While the invention has been shown and described with reference to different embodiments thereof, it will be appreciated by those skilled in the art that variations in form, detail, compositions and operation may be made without departing from the spirit and scope of the invention as defined by the accompanying claims.

What is claimed is:

1. A door rail system for mounting a pane, comprising:

a longitudinally extending clamp housing, having a tapered projection;

a first longitudinally extending clamp, having a first recess;

a second longitudinally extending clamp, having a second recess;

an adjustable fastening means for fastening the first and second clamps to the tapered projection; and

a pane channel defined by the first and second clamps for receiving an edge of the pane,

wherein the tapered projection is configured to interlock with the first and second recesses when the first and second clamps are clamped together by the adjustable fastening means, and wherein when the first and second clamps are clamped together, the first and second recesses are symmetrical with respect to the tapered projection, the tapered projection is positioned at a center point between the first and second recesses, and the pane is placed along the center point between the first and second recesses.

2. The door rail system of claim **1**,

wherein the adjustable fastening means comprises a screw, a through hole and a threaded hole,

wherein the through hole is configured so that the screw can pass there-through,

wherein the threaded hole is configured to be engaged with the screw for clamping the first and second clamps together to securely hold the pane.

3. The door rail system of claim **2**,

wherein the first clamp comprises a first inner wall and a first outer wall, and wherein the second clamp comprises a second inner wall and a second outer wall.

4. The door rail system of claim **3**,

wherein the through hole is formed on the second clamp and the threaded hole is formed on the first clamp,

wherein the screw advances through the second outer wall of the second clamp and the through hole of the second clamp and then, the screw is engaged with the threaded hole of the first clamp.

5. The door rail system of claim **3**,

wherein the through hole is formed on the first clamp and the threaded hole is formed on the second clamp,

wherein the screw advances through the first outer wall of the first clamp and the through hole of the first clamp and then, the screw is engaged with the threaded hole of the second clamp.

6. The door rail system of claim **3**,

wherein a first groove is formed on the first inner wall and a second groove is formed on the second inner wall,

wherein the first and second grooves form an opening when the first and second clamps are clamped together.

7. The door rail system of claim **6**, further comprising an end cap secured at an end of the clamp housing by an end cap fastening means.

8. The door rail system of claim **7**,

wherein the end cap fastening means comprises an end cap screw which is configured to be engaged with the first and second grooves.

9. The door rail system of claim **1**,

wherein the tapered projection comprises a first tapered wall, a second tapered wall and a wide end surface,

wherein the first recess comprises a first inclined wall and a first flat surface,

wherein the second recess comprises a second inclined wall and a second flat surface,

wherein the first inclined wall is located adjacent to the first tapered wall and configured to be approximately parallel to the first tapered wall when the first and second clamps are clamped together,

wherein the second inclined wall is located adjacent to the second tapered wall and configured to be approximately parallel to the second tapered wall when the first and second clamps are clamped together,

wherein the first and second flat surfaces are located adjacent to the wide end surface and configured to be approximately parallel to the wide end surface when the first and second clamps are clamped together.

10. The door rail system of claim **9**,

wherein when the first and second clamps are clamped together, the first inclined wall is in contact with the first tapered wall, the second inclined wall is in contact with the second tapered wall, and the first and second flat surfaces are in contact with the wide end surface.

11. The door rail system of claim 1, further comprising a first slide cover for covering a first exterior side surface of the clamp housing.

12. The door rail system of claim 11, further comprising a second slide cover for covering a second exterior side surface of the clamp housing.

13. The door rail system of claim 1, further comprising an accessory channel wherein the accessory channel comprises a first inner wall, a second inner wall and a base surface.

14. The door rail system of claim 13,

wherein a first protrusion is formed on the first inner wall of the accessory channel and a second protrusion is formed on the second inner wall of the accessory channel,

wherein the first and second protrusions are longitudinally extending.

15. The door rail system of claim 14, further comprising a first mounting member which is configured to be slidably inserted into and engaged with the accessory channel and secured therein by the first and second protrusions.

16. The door rail system of claim 15, further comprising a second mounting member which is configured to be slidably engaged with the first mounting member by a sliding dovetail joint so that the second mounting member can slide against the first mounting member.

17. The door rail system of claim 16, further comprising a location adjusting means for slidably adjusting a location of the second mounting member with respect to the first member.

18. The door rail system of claim 17,

wherein the location adjusting means comprises an anchor and a screw wherein the anchor is fixedly attached to the first mounting member,

wherein a through hole is formed on the anchor and a threaded hole is formed on the second mounting member such that the screw can pass through the through hole and be engaged with the threaded hole,

wherein the location adjusting means adjusts the location of the second mounting member by rotating the screw.

19. A door rail system for mounting a pane, comprising

an accessory channel having a first inner wall, a second inner wall and a base surface wherein a first protrusion is formed on the first inner wall and a second protrusion is formed on the second inner wall;

a first mounting member which is configured to be slidably inserted into and engaged with the accessory channel;

a second mounting member which is configured to be slidably engaged with the first mounting member by a sliding dovetail joint so that the second mounting member can slide in a longitudinal direction of the first mounting member wherein the pane is mounted on the second mounting member; and

a location adjusting means for slidably adjusting a location of the second mounting member and the pane with respect to and along the first mounting member,

wherein the first mounting member is secured in the accessory channel by the first and second protrusions,

wherein the location adjusting means comprises an anchor and a screw wherein the anchor is fixedly attached to the first mounting member,

wherein a through hole is formed on the anchor and a threaded hole is formed on the second mounting member such that the screw can pass through the through hole and be engaged with the threaded hole,

wherein the location adjusting means adjusts the location of the second mounting member by rotating the screw.

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